



## A look back

JSC's year of dedication and hard work in the space program is recounted. Story on Page 3.



## Bridwell leaves

Marshall Space Flight Center Director retires after 38 years of service. Story on Page 4.

# Space News Roundup

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## Year in Review: '95 productive, pathfinding

Shuttle, space station, safety accomplishments highlight eventful year

By Kelly Humphries

There were 95 degrees showing on the thermometer and still they came, curious about how their tax dollars were being spent, intrigued by the work their neighbors told them about over the back fence and lured by the potential for a visit to Mission Control.

It was Aug. 26, 1995, and the first JSC Open House. The estimated 50,000 friends and neighbors who came were of all ages, sizes, shapes, cultures and backgrounds. The additional 20,000 people who came just for Space Center Houston's Ballunar Liftoff made the day's total of visitors swell to 70,000.

The Open House, part of a new emphasis on outreach at JSC, was a huge success thanks to the efforts of volunteers across the center. The event allowed many people a comprehensive look at JSC's training facilities, laboratories and work areas, and demonstrations of the work going on at JSC in 1995—everything from astronaut training to engineering, flight operations, and basic research.

The year 1995 was, by any measure, a highly productive and pathfinding year for the prime center for the Human Exploration and Development of Space. The significant accomplishments of '95 clearly showed the

great breadth of activities at JSC, from the first three rendezvous and two dockings of American space shuttles to the Russian space station to a newly invigorated emphasis on safety in the workplace to an extensive zero-base review of how JSC spends its money.

Despite minor schedule setbacks caused by nesting woodpeckers and nozzle joint O-ring sealants, the shuttle program compiled impressive statistics. A total of 45 people rode space shuttles to orbit and/or back—35 men and 10 women. Among them were Eileen Collins, the first woman to pilot a shuttle, and

five Russian cosmonauts. Over seven flights, shuttle crews were in orbit for a cumulative 78 days, 14 hours, 11 minutes and 23 seconds, a feat second only to the 81-plus days of 1994.

The 1995 events that drew the greatest attention were those related to the Phase 1 Program, which included rendezvous and dockings in February, June and November. Norm Thagard, the first U.S. astronaut to ride a Russian rocket, flew to the Mir station in March for a three-month stay. With the transportation of four Russians on the shuttle, this joint expedition set a new record with

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## Thagard leaves JSC to teach at alma mater

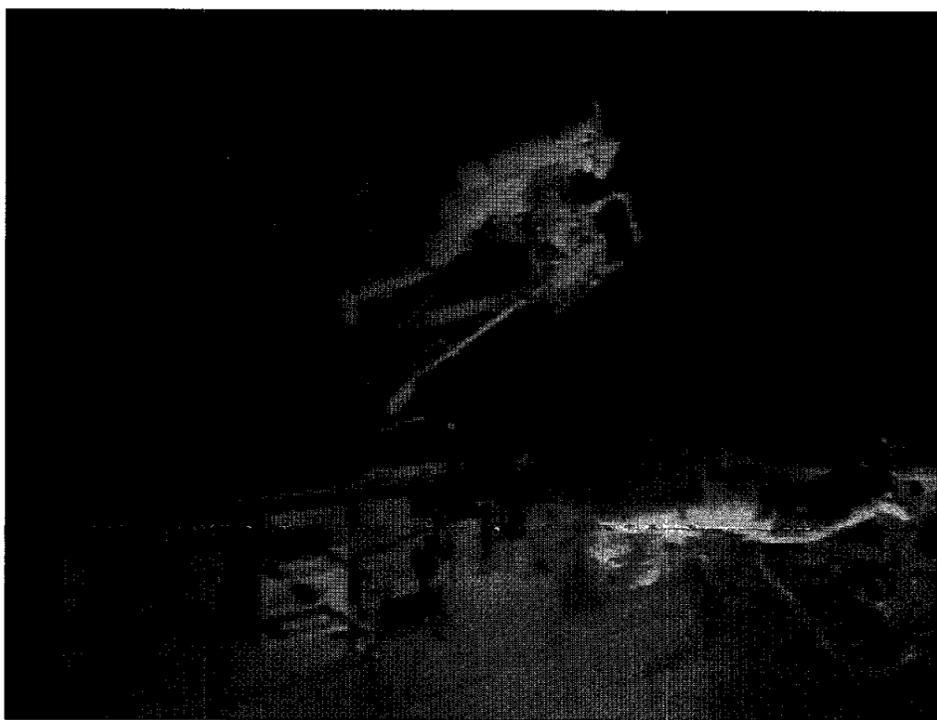
By Kyle Herring

Astronaut Norm Thagard has retired from NASA and returned to his alma mater, Florida State University. He leaves the space agency following five missions, including a U.S. record four-month stay aboard Russia's Mir station.

Thagard accepted the position of visiting professor and director of external relations for the Florida A&M University-Florida State University College of Engineering, Tallahassee. His initial assignment—effective Jan. 5—is teaching electronics, an area that has been a long-time hobby.

Joining NASA as part of the astronaut class of 1978, Thagard flew on

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Mission Specialists Leroy Chiao, left, and Dan Barry work on a portable platform in *Endeavour's* payload bay. Chiao unraveled various lengths of cable while attached to the robot arm and Barry spent time practicing the hookup of the cables and testing his ability to manipulate tiny bolts and screws in weightlessness. He reported that most tasks could be accomplished with little difficulty.

## Satellite duty, space walks occupy crew

With two satellites safely tucked in *Endeavour's* payload bay and two space walks completed, the STS-72 astronauts are preparing for the trip home.

The crew completed the primary objectives of the mission on Wednesday and turned their attention toward onboard experiments and preparations for landing at Kennedy Space Center in the predawn hours Saturday.

Commander Brian Duffy and Pilot Brent Jett maneuvered *Endeavour* toward the Japanese Space Flyer Unit and Mission Specialist Koichi Wakata plucked the satellite from its 10-month scientific voyage berthing it in *Endeavour's* cargo bay before turning to the deployment and retrieval of the OAST-Flyer satellite. Between satellite retrievals, the crew performed two space walks to test tools and techniques for the assembly of the International Space Station.

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## JSC pays tribute to seven explorers lost a decade ago

Ceremony includes period of silence, fly-over

A decade has passed since seven American space explorers were lost aboard the Space Shuttle *Challenger* on Jan. 28, 1986. On Monday, JSC will honor the crew in a brief commemoration.

The United States flag in front of Bldg. 1 will be lowered to half-staff on Sunday, Jan. 28, in honor of Commander Dick Scobee, Pilot Mike Smith, Mission Specialists Judy Resnik, El Onizuka and Ron McNair, and Payload Specialist Greg Jarvis and Christa McAuliffe.

At 10:30 a.m. CST Monday, Jan. 29, with the flag still at half-staff, all JSC employees will be temporarily excused from their work duties to gather with colleagues in paying tribute. At 10:38 a.m., the Emergency Warning System

will signal the beginning of 78 seconds of silence in remembrance of the crew. The end of the period will be punctuated by a NASA T-38 "missing man" fly-over of the center.

Between 10:35 a.m. and 10:40 a.m., all traffic will be temporarily barred from entering or leaving all JSC gates. Likewise, employees are asked to cooperate by stopping their vehicles while on JSC streets and parking lots.

"The legacy of these seven brave pioneers continues in all of our hearts and in our work today," said Acting JSC Director George Abbey. "Please join with me in honoring their courage and dedication, their pursuit of knowledge and discovery. We will always remember them."

## NASA administrator praises Challenger spirit

NASA Administrator Daniel Goldin honored the *Challenger* crew and encouraged NASA employees to carry their legacy into the future.

"The best way to honor the memories of the crew of the *Challenger*, and of all the men and women who have given their lives to explore the frontiers of air and space, is to continue their bold tradition of exploration and innovation," he said. "That's what the people of NASA do every day. They push the boundaries of knowledge and human endeavor to improve and enrich life on Earth today and secure a better future for all of us tomorrow."

"I've said many times that safety is the highest priority at today's NASA. We will not waver from that commitment. But human

beings have always taken great risks to reap great rewards. Space flight is inherently dangerous and every member of the NASA team understands those risks.

"I'm proud of the women and men of NASA. They're blazing the trail to the future. They're building the components of the International Space Station. They're constructing spacecraft that will explore the farthest regions of the Solar System and the universe, and satellites that will monitor the health of our own blue planet for years to come. They're conducting cutting edge research that will make airplanes faster and safer, and they've made the space shuttle the most capable, reliable and versatile spacecraft in the world."

## Johnson earns AIAA accolades

Gary Johnson, deputy director of the Safety, Reliability and Quality Assurance Directorate, will receive the annual AIAA System Effectiveness and Safety Award at a Monday luncheon being held during the Reliability and Maintainability Symposium in Las Vegas.

Johnson and Boris Sotnikov, deputy chief of the Project Division of RSA Energia, are being honored for their work on the Phase 1 Program Shuttle/Mir Joint Safety Assurance Working Group.

"They have exemplified safety and mission assurance responsibilities over a wide range of efforts across the program involving development

of unique hardware, joint vehicle mission operations, analyses to identify and resolve hazardous conditions and ensuring the safety of both vehicles and both crews," said Frederick Gregory, associate administrator for Safety and Mission Assurance at NASA Headquarters. "Key to the successful accomplishment of these efforts has been Mr. Johnson's and Dr. Sotnikov's concerted effort to ensure effective joint communication, coordination and mutual consideration supporting the NASA RSA Energia partnership."

"Johnson and Sotnikov have developed a method to jointly deal with an extremely complex systems

safety challenge," said SR&QA Director Charlie Harlan.

The technical disciplines in the shuttle/Mir program required rigorous systems safety analysis and hazard controls. The team integrated different methods and documentation techniques into a single joint process that met both countries' needs.

"The fact that the entire systems safety process is conducted jointly is no small challenge. Gary and Boris have worked together as a team overcoming the obvious cultural and language difficulties to establish a productive and effective systems safety program for shuttle/Mir," Harlan added.



Gary Johnson

## Engineers visiting schools next month

For the fifth year, JSC employees will participate in National Engineers Week, which is Feb. 18-24.

National Engineers Week is an annual event to raise public awareness and appreciation of engineers and their work.

Through JSC's Education Outreach Program, civil service and contractor engineers and other volunteers will visit area classrooms to show students how math, science and engineering create the world around them and introduce them to technical careers.

Billie Deason, leader of the coordination, Please see JSC, Page 4

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# Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

**Ice Hockey:** Houston Aeros vs. Fort Wayne Komets 4 p.m. Feb. 4 at the Summit. Tickets cost \$12.50.

**Moody Gardens:** Discount tickets for two of three different attractions: \$9.50

**Space Center Houston:** Discount tickets, adult, \$8.75; child (3-11), \$7.10.

**Movie discounts:** General Cinema, \$4.75; AMC Theater, \$4; Sony Loew's Theater, \$4.75.

**Stamps:** Book of 20, \$6.40.

**JSC history:** *Suddenly, Tomorrow Came: A History of the Johnson Space Center.* Cost is \$11.

**Metro tickets:** Passes, books and single tickets available.

**Upcoming events:** Rodeo Carnival Packages includes 28 rides for \$10.

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# Gilruth Center News

**Sign up policy:** All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a NASA badge or yellow EAA dependent badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304.

**EAA badges:** Dependents and spouses may apply for photo identification badges from 7 a.m.-9 p.m. Monday-Friday; and 8 a.m.-4 p.m. Saturdays. Dependents must be between 16 and 23 years old.

**Stamp club:** Meets at 7 p.m. every 2nd and 4th Monday in Rm. 216.

**Aerobics:** Classes meet at 5:30 p.m. Monday, Tuesday, Thursday and Friday and 9:30-11 a.m. Saturdays. Cost is \$35 for 11 weeks.

**Women's self defense:** Martial Arts training for women only from 5-6 p.m. Tuesdays and Wednesdays. Cost is \$25 a month.

**Weight safety:** Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. Jan. 25. Pre-registration is required. Cost is \$5.

**Exercise:** Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays.

**Aikido:** Martial arts class meets from 5-7 p.m. Wednesday. Cost is \$25 per month. New classes begin the first of each month.

**Ballroom dancing:** Cost is \$60 per couple. For additional information call the Gilruth Center at x33345.

**Country and Western dancing:** Beginner class meets 7-8:30 p.m. Monday. Advance class meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

**Fitness program:** Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Wier at x30301.

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# Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Ads may be run only once. Send ads to Roundup Swap Shop, Code AF2, or deliver them to the deposite box outside Rm. 181 in Bldg. 2. No phone or fax ads accepted.

## Property

Sale: League City, Bayridge subdivision, 3-2-2, cul-de-sac, new roof, \$55.k. James, 286-1934.

Rent: Duplex, Santa Fe, TX, 3-1-5, LRM, DRM, appli, central air/heat, brick ext, W/D conn, sm yard, non-smokers, no pets, \$500/mo + sec deposit. 244-0250.

Lease: Bay Glen, 3-2-5-2 + study/FDRM, 1600 sq ft, huge covered patio, back yard, cul-de-sac, non-smokers, \$1,050/mo. Leah, x34544 or 480-8780.

Sale: Waterfront home, 4,140 sq ft, 3 to 5 BDR's, lg garage, 2 carports, covered deck, \$250k. 474-2214.

Rent: Waterfront Townhouse, The Wharf, LC, roomy 2-2-1 plus loft, quiet, \$105/mo. 244-2224.

Rent: Waterfront executive Townhome, South Shore Harbor Marina, furn, 2 MSTR suites, 2.5, 60' boat slip, \$1.9k/mo. 334-5000.

Sale: Waterfront Bay, 4-4, carport, game room, extras, boat lift. 339-3498.

Sale: Boat slip on Clear Lake w/roof & motorized boat hoist for power boats, \$7.5k. 474-4922.

Sale: Wooded 1 acre lot, Enchanted Valley Estates, NW Hou, deed restricted w/all util, \$9.9k. 333-4609.

Sale: Wooded corner lot, Corinthian Pt, Lake Conroe, restricted, \$4.5k. 282-6664 or 409-856-3483.

Sale: Webster, condo, 2-2-2CP, new A/C, kitchen & bath, FPL, W/D conn, ceiling fans, \$39.5k. 280-0285.

Sale: Seabrook condo, 2-1-5, corner unit, FPL, pool, 2 balconies, appli, \$32k. Laura, x31303 or 326-1573.

Sale: CLC, Oakbrook, 3-2-2, cul-de-sac, lg lot, trees, ex cond, \$87k. 488-4069.

Sale: House in Sterling Knoll, 3-2-2, FPL, pool, approx 1.3k sq ft, \$73k. x32264 or 488-5962.

Lease: MeadowGreen, 3-2-5-2, 2 story on cul-de-sac, FDRM, fans, \$900/mo + dep. 486-8551.

Lease: Egret Bay condo, 2-2CP, split plan, W/D, FPL, fans, \$525/mo + dep. 486-8551.

Rent: University Trace condo, lg 2-2, bar, W/d, FPL, \$595/mo. x35000 or 486-0021.

Sale: Silverleaf Resorts vacation ownership, 365 day access to 5 Texas Resorts & 2 in Missouri. 481-8467.

Rent: Beach cottage, Crystal Beach, Galveston County, ocean view, furn, FPL, cable/TV, sleeps 10, wkly/wkends. 486-1888.

Lease: Lake Travis cabin, private boat dock, central air/heat, furn, sleeps 8, \$550/wkly/\$120/dly. 474-4922.

## Cars & Trucks

'89 Plymouth Voyager LE minivan, 7 pass, A/C, overhd console, pwr, AM/FM/cass, cruise/tilt, capt chairs, gray/wood grain, \$4.9k, x39152 or 333-2218.

'93 Nissan 240sx Sport Coupe, maroon, ex cond, new tires/brakes, auto, A/C, AM/FM/cass, ext warr, 39k mi, \$11.9k. Tammy, x38853 or 488-5352.

'95 228 Camaro, T-tops, black w/gray int, Delco Bose stereo/CD player, alarm/tint, pwr, ex cond, 14.5k

mi, \$18.7k. Pam, 482-4162 or 286-1731.

'88 Chevy Spectrum, 1 owner, tinted windows, std, 4 dr, ex work car, \$1,465. Lorraine, 480-0014 x33.

'95 Saturn SL2, 21k mi, white, 5 spd, \$13k. x34932 or 554-8465.

'90 Subaru Legacy, auto, A/C, PW/PL/PM, cruise, tilt, 61k mi, \$6.5k. 333-4609.

'86 Olds Royal Brougham, loaded, leather, 104k mi, runs well, \$2,850. 488-4412.

'86 S10 Chevy truck, rebuilt engine, new shocks, tires/clutch, \$1.6k. 332-8444.

'84 Chevy van, 8 pass, runs good, needs paint, \$2.2k obo. Charlie, 554-6201.

'84 Mazda RX-7 GSL-SE black/red, 5 spd, sunroof, AM/FM/cass, ex cond, \$2,950. 582-0415.

'90 Isuzu Impulse, maroon, A/C, AM/FM/cass, 93k mi, \$2.5k. x31443 or 997-8044.

'88 Ford Mustang convertible LX, white, new top, good cond. Rosanne, 326-2167.

'82 Mazda RX-7 GSL, gold, 5 spd, sunroof, AM/FM/cass, 66k mi, runs nice, \$1.5k. 480-6839.

'89 Grand Caravan SE, blk cherry, 109k mi, V6, sunscreen glass, \$3.9k. Tom, 244-4428 or 334-2232.

'79 Chevy Camaro, ex cond, rebuilt eng/trans, new paint, \$2,950 obo. Michael, 244-0043 or 532-1946.

'90 Honda LX, 2 dr, auto, charcoal, ex cond, new brakes/tires, \$8.1k obo. 334-7258.

'90 Mercury Cougar, 66k mi, elect, sunroof, JBL CD stereo, new tires, ex cond, \$7.5k. x32827 or 538-2152.

'74 Mercedes, 133k orig mi, sunroof, never wrecked, good cond, make offer. 333-1789.

'85 Plymouth Voyager, 7 pass van, 2nd owner, well maintained, \$3.8k obo. x32731 or 480-0889.

'91 Peugeot 405S, loaded, all pwr, ex cond, \$5k. obo. 282-4587.

'79 Datsun 280ZX coupe, 5 spd, A/C, 97k mi, \$1.9k obo. 280-8608.

## Boats & Planes

Sunfish sailboat in good cond on Lake Placid 1 block off I-10 at Sequin, \$300. x35180 or 326-3706.

'92 Kawasaki Jet ski 750 Super Sport, new engine, trailer, life vest, \$3.5k. x32264 or 488-5962.

Sailboard, 9'7" Roberts custom course slalom, \$750 firm. David, 486-8487.

MonArk sailboat, 10', good cond, \$300. David, x34153 or 338-8783.

## Cycles

'86 Honda Magna 700CC, ex cond, \$2.5k. 488-6526.

'96 Honda XR250 dirtbike, warranty. 286-8822.

'94 Suzuki 40 Jr., low miles, \$750. Carl, x45159 or 328-6663.

## Audiovisual & Computers

CompuAdd 386 computer w/1.2 MB 5.25" drive, 40 MB HD, 14" Samsung CVGA monitor, mouse, misc SW; Panasonic KX-1124 (24-pin) dot matrix printer, \$500; IBM PC Jr. w/expansion chassis; IBM color monitor, 640k memory, 2 5.5 drives, in working cond, \$100. Richard, x31488.

Pentium 75, 100 & 133 comp system, full warr, \$1,125/\$1,225/\$1,535; 286 CPU only, \$50; 386 w/color monitor, \$365; 486 w/color monitor, \$595. Don, x38039 or 333-1751.

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# Dates & Data

## Today

**Cafeteria menu:** Special: tuna noodle casserole. Total Health: broiled chicken breast. Entrees: deviled crabs, broiled pollock, liver and onions, broiled chicken with peach half, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, cauliflower au gratin, steamed rice, vegetable sticks.

## Monday

**Cafeteria menu:** Special: Italian outlet. Total Health: herb flavored steamed pollock. Entrees: barbecue beef spare ribs, steamed pollock, baked chicken. French dip sandwich. Soup: black bean and rice. Vegetables: California mix, okra and tomatoes, vegetable sticks, ranch style beans.

## Tuesday

**Blood drive:** Loral will host a blood drive from 8 a.m.-noon Jan. 23 at 1322 Space Park Dr. For more information call Ed Barela at 335-5023.

**Cafeteria menu:** Special: spaghetti with meatballs. Total Health: baked potato. Entrees: stir fry beef, liver and onions, beef cannelloni, ham steak French dip sandwich. Soup: split pea. Vegetables: winter blend mix, seasoned cabbage, breaded squash, lima beans.

## Wednesday

**Toastmasters meet:** The Space-land Toastmasters Club will meet at 7 a.m. Jan. 24 at the House of Prayer Lutheran Church. For more information call Jeannette Kirinich x45752.

**Blood drive:** Loral will host a blood drive from 8-11 a.m. Jan. 24 at 3700 Bay Area Blvd. and from 1:30-2:30 p.m. Jan. 24 at the Marina Plaza Bldg. For more information call Ed Barela at 335-5023.

**Astronomy seminar:** The JSC Astronomy Seminar will present an open discussion meeting at noon Jan. 24 in Bldg. 31, Rm. 129. For more information, call Al Jackson at 333-7679.

**Cycle club:** The Space City Cycle Club will meet at 5 p.m. Jan. 24 at the Grumman Bldg. at Ellington Field. For additional information call Mike Prendergast at x45164.

**NMA class:** The Texas Gulf Coast Council of National Management Association is hosting a 10-hour money management seminar from 6-9 p.m. Jan. 24, 31 and Feb. 7. Cost is \$50 per couple for members and \$75 per couple for non-members. For additional information call Richard Hergert at 280-0444.

**Cafeteria menu:** Special: smoked barbecue link. Total Health: roast porklink. Entrees: cheese enchiladas, roast pork and dressing, baked chicken, steamed pollock, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, Spanish rice, turnip greens, peas and carrots.

## Thursday

**AIAA meets:** The American Institute of Aeronautics and Astronautics will meet at 5:30 p.m. Jan. 25 at the Gilruth Center. Ross Fleisig will discuss "The First Lunar Spacecraft, its Design, Manufacture and Mission." Tickets cost \$10 for members and \$11 for non-members. Reservations must be made by Jan. 22. For information call Tanya Bryant at x31175 or Misty Armstrong at 333-4419.

**Cafeteria menu:** Special: chicken fried steak. Total Health: roast beef with gravy. Entrees: steamed pollock, lasagna with meat, steamed pollock, catfish, French dip sandwich. Soup: cream of turkey. Vegetables: whole green beans, butter squash, cut corn, black-eyed peas.

## Friday

**Gemini anniversary:** A Gemini program will celebrate its 30th anniversary at 5 p.m. Jan. 26 at the Gilruth Center. Tickets cost \$5. For information call Jo Carey at x30546.

**Cafeteria menu:** Special: fried chicken. Total Health: vegetable lasagna. Entrees: pollock hollandaise, beef stroganoff, vegetable lasagna. Vegetables: steamed broccoli, carrots vichy, Italian zucchini, breaded okra.

## Jan. 30

**Blood drive:** JSC will host a blood drive from 7:30-11:30 a.m. and 1-3 p.m. Jan. 30 at the Gilruth Center. For additional information call Marty Demaret at x36007.

## Feb. 1

**Warning system test:** The site-wide Employee Warning System will under go its monthly audio test at noon Feb. 1. For more information call Bob Gaffney at x34249.

## Feb. 6

**ABWA meets:** The American Business Womens Association, Clear Lake Area Chapter will meet at 5:30 p.m. Feb. 6 at Space Center Houston's Silver Moon Cafe For additional information call Nancy Hutchins at x34006.

## Feb. 8

**NPM meets:** The National Property Management Association will meet at 5 p.m. Feb. 8. For more information and meeting location call Marie-France Smith x39309.

**Airplane club meets:** The Radio Control Airplane Club will meet at 7:30 p.m. Feb. 8 at the Clear Lake Park Community Bldg. For additional information call Bill Langdoc at x35970.

motionless mattress, heater/liner & wooden frame. Chuck, 282-3908.

Childs chest of drawers, dk stain, \$50, utility cabinet, approx 16"x18"x36", birch, \$15. Sam, 332-3168.

Fisher 25" stereo TV floor console, ex working cond, \$125. 282-4587.

5 pc bunkbed set, \$275; wood desk, \$40; cabinet sewing machine, \$35; other misc items. 332-8444.

Sears 16" frostless refrigerator, brown, old but still working w/ice maker, \$125. L.G., 326-1946.

## Wanted

Want non-smoking housemate to share 3 bedroom, 4 k sq ft, gorgeous waterfront home on Taylor Lake, pool, boat dock, hot tub, own furnished bed & bathroom, \$600 mo w/bill paid. Leah, x34544 or 480-8780.

Want to share a house in Clear Lake area. 3-2-2, with a professional male, non-smoking, \$400 + util. Joseph, 474-6359 or 480-1670.

Want roommate to share large home in Seabrook, all bills included, avail 02/01. 333-6821 or 326-2093.

Want non-smoking roommate to share 4-2, FWD home, W/D, microwave, VCR, household privileges, \$250/mo bills pd. Michael, x38169 or 482-8496.

Want person to join VPSI vanpool departing South Braeswood Park & Ride lot at 6:50 a.m. for JSC & offsite locations, 7:30 - 4:30 shift, Susan Gaynor, 282-5447 or Al Ruder, x34997.

Want personnel to join VPSI vanpool departing Meyerland Park & Ride at 7:05 am for JSC. Van pool consist of on-site personnel working 8 am/4:30 pm shift. Don Pipkins, x35346.

Want fixer upper house, \$10.k - \$50.k. 992-5080.

Want bunk bed for children in good condition for a reasonable price. 244-0250.

Want in-line skates, w/or w/o pads, mens 8.5 or 9, good cond only, Bauer, rollerblade or similar. x35761 or 480-6557.

Want nurturing lady to care for infant 2 days a wk starting March, Friendswood area only. 482-7792.

Want Champion juicer. 474-4922.

Want heat transfer by J.P. Holman, 6th edition. 492-1256.

Want to take over payments or buy '91 - '95 Toyota or Nissan. 867-8820.

Want STS-74 payload & experiment cloth patches & decals. Andrew, x34312 or 280-0647.

## Miscellaneous

Mixed firewood, \$55 cord. 996-6814.

Antiques for sale: oak mantel, gooseneck floor lamps, milk cans, sad irons, Singer treadle sewing machine in ornate oak cabinet, bird cage stand, maple deacon's bench, insulators, kerosene lamps, oak fireplace screen, & 3 pc iron fireplace tools. x30021 or 479-7947.

Suzuki Samurai chrome bumper set, ex cond, new \$385 make offer. 480-5404.

Men's black leather coat, full length, sz 42, removable liner, ex cond, \$200 obo. 332-7427.

Heavy punching bag, canvas, 70lbs, \$40. Rob, x31477.

Continental Air voucher \$386 value sell \$300. x31443 or 997-8044.

Hot tub, portable, 6'x7' w/cover, fair cond, needs work, U-haul, \$250 obo. 244-1082 or 483-1082.

Stair stepper, new \$150 sell \$50. 480-9448.

Nordic Track Walk Fit, very low mileage, new \$600 sell \$400. 334-3020.

Roll top desk, \$700 obo; queen size bed-n-frame, \$50; snow chains, \$10; super single waterbed w/mirrored headboard, \$75. 332-2453.

Montgomery Wards commercial riding lawn mower, 11 hr, 38" cut, \$350; BMX bikes, 2 mini 20", \$300 both or \$175 ea. Carl, x45159 or 328-6663.

Wedding dress, sz 9/10 long sleeved lace fitted jacket, chapel length train & matching lace hat w/veil, \$100. Shari, x36076 or 992-3517.

Peavey SP-4 DJ speakers, \$800; Junior fog machine, \$200. Jimmy, 337-5583.

Upholstered chair/rocker, \$20; wood/particle board play kitchen set, \$10; 16" girls bicycle, \$5. Rick, x31972 or 338-4568.

Joelle designer wedding dress, short train, white, sz 8, veil & krenelin incl, \$600; blk leather car mask for Honda CRS, \$40; beige mini blinds, \$4/ea; leather briefcase, \$75; qn sz bed frame, \$20. Su, x45722.

Jenny Lind white baby crib w/mattress, \$70; Grayco High chair, \$40; solid oak desk w/2 matching solid oak 2 drawer filing cabinets, \$400. 334-3205.

Rabbit cage w/ removable under tray, ex cond, indoor model, assess/supplies, \$45. Bob, x33149.

Sony 27" Trinitron TV, \$425; Magnovox 26" color TV, \$250; DCM stereo spkrs, \$95 pr; Montgomery Ward 4 hd VCR w/remote, \$160; Symphonie 3 hd VCR w/remote, \$85; Konica office copier, \$160; Panasonic 1124i dot matrix printer, \$140; 30" TV whitewash enter center, \$420; office copier stand, w/rollers, \$45; FPL elect heat blower, \$20. Gus, x33425 or 286-3405.

Model airplanes, Byron AT-6 kit, complete W/G-62, retracts, \$950; JMP Starfire II-B kit, \$550; Starfire II-B ready to fly, \$2.5k obo. JMP T-33 ready to fly, \$4.2k obo. x38879 or 332-1991.

Wedding dress, white, sz 3/5, w/petticoat & veil, \$225; wet suit, sz lg, ex cond, \$100. 996-1051.

Tilt-bed trailer w/ramps, removable sides, 2 axes, ex cond, garage kept, obo. Tom, x36309 or 474-9747.

Nordic Track, Sequoia, \$275; high country bow, full set w/case, \$275. 332-7356.

Selling gun collection, rifles, pistols, bayonets, knives, other military pcs, some radio gear. 326-1946.

Tappan dishwasher, 2 cycle, \$50; SW Bell Freedom phone cordless, \$30; NEC 700 cellular phone 2 chargers, leather case, \$125; ABU Garcia bait cast reel 6

# '95 Year in Review

## Shuttle-Mir linkups, renewed emphasis on safety prominent



(Continued from Page 1)

10 people living and working together on a single space vehicle.

The Phase 1 activities, which also included groundbreaking scientific research and the delivery of a permanent Russian-built docking port that will support five more dockings, provided valuable experience that will play a critical role in preparing NASA and its partners for the start of construction of the International Space Station just two years from now. In addition, the intensive cooperation and interchange among the world's top space-faring nations provided an infusion of alternative experience and thinking that is enhancing both shuttle and station.

"I've been impressed with the fact that the things we did on this mission are exactly the sorts of things we need to do with space station," said Hoot Gibson, commander of STS-71, the first docking mission and the 100th U.S. human space flight. After setting the American record for length of stay on orbit, Norm Thagard, the first U.S. cosmonaut researcher to work aboard Mir, echoed those sentiments by saying "This is the way a space station ought to work."

JSC technicians played a pivotal role in Mir's preparations for the docking flights by fabricating both the docking target affixed to Mir and a special tool to cut through a balky retention bar on a Spektr solar array panel that had been delivered by way of a Russian rocket. The Extended Length General Purpose Cutter was put together and tested in just six days, then delivered by *Atlantis*, meriting JSC's W.B. Wood the coveted Eagle Award to be presented at the Goddard Space Flight Dinner this spring.

The year 1995 also saw another major change in the Space Shuttle Program. With significant spending reductions already putting conventional operations to the test and further budget reductions on the horizon, top NASA managers began looking for new ways of doing shuttle business. In March, an independent review panel led by legendary flight director Christopher Kraft recommended that in the interests of providing a more effective and efficient operation and a less costly one, that NASA should relinquish hands-on management control of shuttle operations to a single prime contractor. In November the agency began negotiations on a non-competitive contract for those services with the United Space Alliance, a consortium led by Rockwell International and Lockheed Martin.

Development of the International Space Station continued to progress throughout the year, meeting both programmatic and construction milestones. In January, NASA and Boeing signed a \$5.63 billion contract for design and development through the year 2003, solidifying the role of the prime contractor and incorporating

features that will reduce costs and risks. In April, the station passed its second major Incremental Design Review, which assured that the station as designed can be ferried into orbit, assembled, operated and put to use for research through the first set of assembly flights. The Government Accounting Office verified that that station is on track and under budget in June following an annual audit of the program. And in August, Boeing and Russia signed a \$190 million contract that has America's former space adversary providing the first flight element of the station.

In May, the station's water purification system passed a series of tests designed to evaluate new components and challenge its ability to remove contaminants from the water, and in September, the main structure of the 28 by 14-foot, waffle-patterned U.S. laboratory module left the welding shop in one solid piece.

A number of JSC facilities and capabilities that will help lead the way for future space exploration made headway in 1995. NASA signed a lease/purchase agreement with McDonnell Douglas Corp. to acquire land and buildings at Ellington Field for a long-awaited Neutral Buoyancy Laboratory that will become the proving ground for station assembly practices and equipment. In April, the facility was named the Sonny Carter Training Facility in honor of the unique and talented astronaut who was lost in a 1991 plane crash.

The new Mission Control Center in Bldg. 30 made its debut in July following the deployment of a Tracking and Data Relay Satellite that was controlled from the original Mission Control during STS-70. Flight controllers vacated the historic venue, which for three decades had been the scene of countless accomplishments and drama, and walked down the hallway to a room decked with Alpha workstations, where they successfully oversaw the remainder of the orbit activities before returning the original room just before landing. Conversion to the new facility, which uses state-of-the-industry interchangeable computer workstations, has since gone extremely well, and this year the original control center will be phased out entirely.

In August, Goldin announced plans to establish a new science institute for space life sciences, based at JSC, in an effort to streamline the agency's management structure and improve the overall quality of scientific research. Envisioned as a privatized arrangement under

which researchers from universities or industry use government-owned assets to conduct and share their research, the institute is to be the centerpiece of NASA's strategy to foster world-class life sciences research in support of human space exploration.

Also in August, Lockheed-Martin life support systems scientist Nigel Packham gained worldwide notoriety by living in a closed-loop atmosphere for 15 days, breathing oxygen recycled entirely by about 30,000 thriving wheat plants. The regenerative life support systems test in Bldg. 7 was the first in a series of tests of advanced technologies that will be required for long-duration space flight permanent bases on the Moon or Mars.

Along the same lines, JSC fashioned a new technical test bed in October that will provide scientists and engineers with a place to perform research into the use of extraterrestrial resources to live off the land on alien worlds. Called the Mars In-Situ Resource Utilization System Technology Breadboard Program, the test bed is a direct response to the challenge of using new technologies and management approaches to reduce the cost of human exploration of the Moon and Mars.



Cutting costs was a continuing theme throughout the year as ever tightening budgets began forcing NASA to pare itself down to a size it hasn't seen since the early Apollo years. The fiscal 1996 budget for the agency was \$14.26 billion, down 1.4 percent from the previous year. In January, all federal agencies began to respond to legislation designed to cut more than 270,000 employees—or about 12 percent of the government's work force—by the end of the decade. At NASA, the call led to additional reorganization efforts and renewed emphasis to ongoing efforts to find new, more efficient ways of doing things. A second round of buy-outs, intended to allow retirement-eligible employees additional incentives, was offered in February. In March, President Clinton called NASA a role model in the reinvention of government under the auspices of the National Performance Review.

"The tough news is that we will make fundamental changes at NASA to absorb future cuts," Goldin said. "Make no mistake; when this is over, NASA will be profoundly different. We're going to restructure the agency, but the NASA that emerges is going to be better than ever."

Senior NASA managers conducted an all-encompassing Zero-Base Review, looking for innovative ways to streamline operations, reduce overlap and significantly cut costs while delivering quality and balance in its programs. The open peer review cut across all programs and objectives, leaving no stone unturned and seeking savings in every area. Each NASA center becomes a "center of excellence," concentrating on specific aspects of NASA's mission, while administrative and program functions are consolidated to save money.

In the midst of extensive belt-tightening efforts, JSC implemented a far-reaching effort to improve safety. Following last year's release of toxic gas from the Thermochemical Test Area, the ensuing safety review produced recommendations which led to renewed emphasis on making the center a decidedly safer place to work.

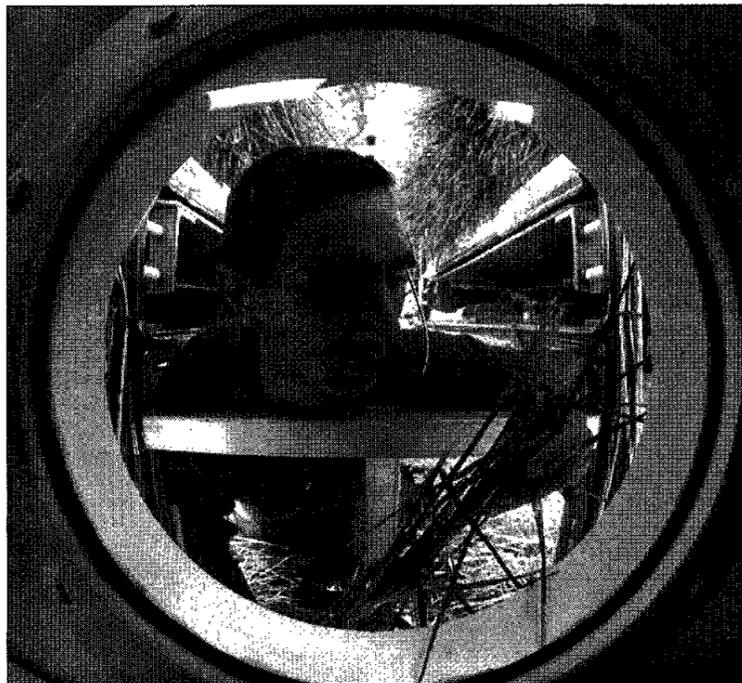
Examples of the new "safety attitude" included a crackdown on curb-side parking designed to increase pedestrian safety, the creation of a new close calls reporting procedure designed to flag areas of concern before accidents occur and the installation of a state-of-the-art siren system to alert employees and the surrounding community to imminent danger from weather or hazardous chemicals. The first Director's Safety Page—the name will be changed with this year's first issue—made its debut in the Space News Roundup in June, as managers and employees shared information and ideas about the subject. The exchange continued Aug. 30 when the entire center took a "time out" for the first Safety Awareness Day.

For most of the year, JSC employees continued to work ambitious schedules toward well-defined goals and objectives. Even with two year-end government employee furloughs which forced many civil servants to stay home from work, the shuttle manifest and the space station development schedule remained on track thanks to the efforts of the contractor workforce and exempted civil servants.

The year of dedication and hard work by the JSC team was recognized by those outside the agency, with solid support in Congress for the space station program serving as one bell-weather.

The comment cards returned following the JSC Open House showed a common healthy interest in space exploration among the general public. Ninety percent said they believe government-funded space activities provide many economic benefits to the national economy.

Such interest and enthusiasm shows that NASA's continued accomplishments and productivity are appreciated by a public that understands and appreciates the groundwork its people are laying for 1996 and beyond. □



From top to bottom, left to right:  
1) STS-71 Commander Hoot Gibson shakes hands with Mir 18 Commander Vladimir Dezhurov just minutes after the hatches between *Atlantis* and Mir were opened. The June 29 docking of the American shuttle to the Russian outpost was one of many historic moments in space flight during 1995.  
2) Norm Thagard, the first American aboard the Russian Mir Space Station, spends part of his 115 days in space exercising.  
3) Test subject Nigel Packham displays a handful of the 30,000 wheat plants that produced oxygen for him during a 15-day regenerative life support systems test in Bldg. 7. The plants actually produced twice as much oxygen as Packham needed. The test, completed Aug. 8, was the first of its kind at JSC in more than 25 years.  
4) Visitors during JSC's Open House in August get a hands-on demonstration from Bldg. 7 space suit technicians. Visitors learned how astronauts survive in the cold temperatures of deep space.

## Foale, Voss join colleagues in Russia

By Kyle Herring

Three-time shuttle veteran Mike Foale has joined fellow astronauts training at the Gagarin Cosmonaut Training Center in Star City, Russia, for stays on the Russian Mir Space Station.

Foale is the fifth and final astronaut scheduled to stay on Mir as part of the first phase of the International Space Station Program. Jim Voss will serve as Foale's backup.

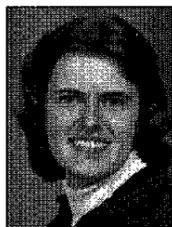
Foale will train as the backup to Jerry Linenger, who will be the fourth astronaut to stay aboard Mir as part of the first phase leading toward development and construction of the International Space Station. Foale then will be the prime crew member for a subsequent Mir stay targeted for late 1996.

Shannon Lucid, the next astronaut to stay on Mir, will be launched on the third docking

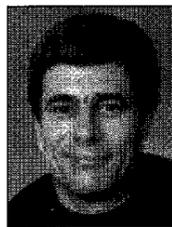
mission, STS-76, scheduled for March. She will return home following a five-month stay and be replaced by John Blaha on the STS-79 mission of *Atlantis*. Blaha will spend about four months on Mir as a prime crew member for the Mir-22/23 crews. The two veteran astronauts have been in Star City since February.

Linenger will replace Blaha on Mir, launching aboard *Atlantis* on STS-81 for a five month mission with the Mir-23/24 crews. Foale will launch on STS-84 to replace Linenger and will spend about four months on the space station with the Mir 24/25 crews. Voss will serve as a backup crew member and is not scheduled for a long-duration stay on Mir.

"The current flight assignments reflect both prime and backup crew members for the docking missions to Mir," said Frank Culbertson, Acting Director, Phase 1 Program. "Each of



Lucid



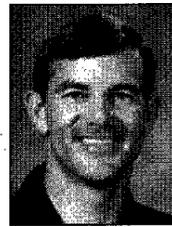
Blaha



Linenger



Foale



Voss

these individuals is extremely talented and all are proven performers in space flight. Both the U.S. and Russian programs will benefit from their experience and their expertise as we continue with these cooperative missions."

The flight assignments for the five astronauts are: Mir 21/22, Shannon Lucid as prime and John Blaha as backup to be launched to Mir on STS-76 and return on STS-79. On the Mir 22/23 crew, John Blaha will be the prime

and Jerry Linenger will be the backup. Blaha will be launched to Mir on STS-79 and return on STS-81. The Mir 23/24 will see Jerry Linenger as the prime astronaut for a stay on Mir with Mike Foale as his backup. Linenger will make his trip to the space outpost on STS-81 and return on STS-84. The final Phase 1 mission, Mir 24/25, will send Mike Foale to the Russian station with Jim Voss as his backup on STS-84 with a return on STS-86.

## Scobee-Rodgers to discuss space contributions

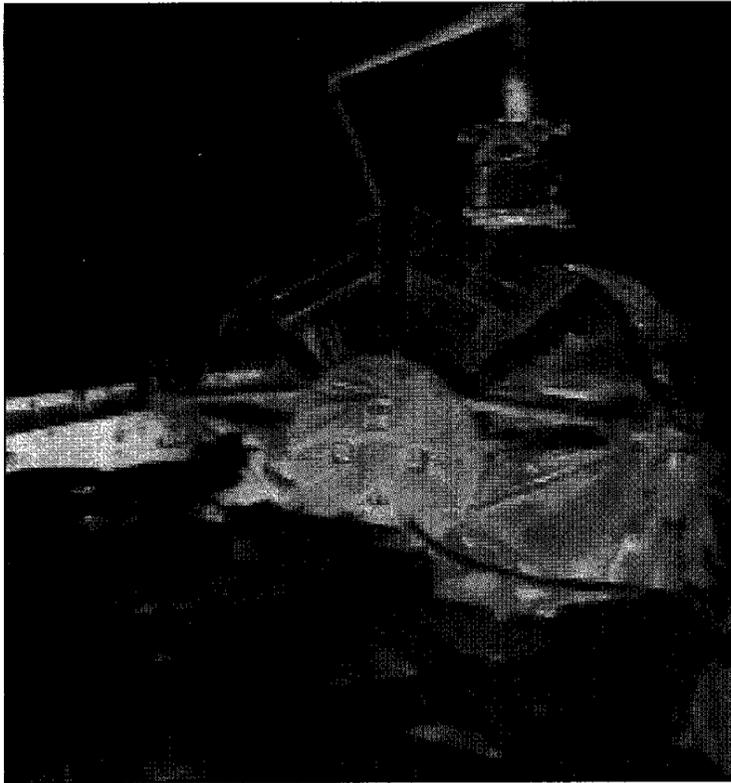
June Scobee Rodgers, founding chairman of the Challenger Center for Space Science Education, will discuss the importance of the space program and its contributions to science and technology at the Houston Engineering and Scientific Society later this month.

Scobee Rodgers, widow of the late Astronaut Dick Scobee, will speak on "Space Simulation, an Innovative Educational Approach Created by Private-Public Sector Initiatives" at 8 p.m. Jan. 30 at HESS, 3121 Buffalo Speedway.

At 7:30 p.m., before the speech, she will be available to sign copies of her new book, "Silver Linings."

The presentation is part of a year-long series of events called "Space Journey to the Future." Presented by HESS, the series is designed to allow the aerospace industry and other technical communities to share information about innovations and how they might benefit from technology transfer.

Reservations may be made by calling 627-2283; cost is \$30 per person. For more information, call Michele Smith at 370-8338.



NASA Photo

Mission Specialist Koichi Wakata uses *Endeavour's* robot arm to berth the 2,600-pound OAST-Flyer science satellite in the cargo bay. The satellite capture followed a textbook rendezvous performed by Commander Brian Duffy and Pilot Brent Jett, who guided the orbiter alongside the satellite through a series of maneuvering jet firings.

## JSC expands engineering outreach efforts

(Continued from Page 1)

nating Public Affairs Office Education Team, describes the importance of JSC civil service and contractor employees volunteering for educational events: "It's exciting that our JSC Education Outreach volunteers directly reach so many local-area students with the National Engineers Week presentations. Our folks have unique real-life work experiences to share about the technology field. Capturing student's interest in technical careers is one of JSC's most significant contributions to our communities."

To reach more students in outlying areas of JSC, invitations were mailed for the first time to schools in

the Houston, Aldine, Channelview, Humble, North Forest and Sheldon independent school districts. The schools surrounding JSC also received invitations. In response to those invitations, 400 teachers requested a volunteer visit.

To fill the demand for volunteer visits to area classrooms, additional volunteers are still needed. Because National Engineers Week is an approved educational event, JSC civil service employees may charge their time spent away from work to a special education labor code.

Resources such as hands-on activities, exhibits, videos and hand-out materials will be made available to volunteers. To further assist vol-

unteers with their presentations, an orientation meeting is scheduled for Jan. 31 in the Teague Auditorium. A guest speaker from Clear Creek ISD will discuss teaching tips. Following the orientation, there will be demonstrations of hands-on activities for use in the classroom.

Beginning next week, volunteers who have signed-up for National Engineers Week will receive assignment letters containing the name and phone number of the teacher they will visit.

If you would like to volunteer for National Engineers Week or any other Education Outreach Program activity, or have additional questions, please call Mae Mangieri at x32929.

## Marshall director retires; Littles to accept position

G. Porter Bridwell, director of Marshall Space Flight Center, last week announced plans to leave his position and retire from NASA by Feb. 3. NASA Administrator Daniel S. Goldin has named J. Wayne Littles the new center director.

Bridwell, 60, has been director of MSFC center since January of 1994. "I've been out here for 38 years, 34 of it with NASA," he told his senior staff this morning, "it's time to go."

"During his long career, Porter Bridwell has epitomized all the best qualities of federal service," said NASA Administrator Daniel S. Goldin. "And, as Marshall director over the last two years, he has paved the way in restructuring the center and defining its new role for the future."

Bridwell started his career as an aerospace industry engineer in 1958, joining NASA four years later. He served as an engineering manager on the Saturn program, headed the development of the space shuttle external tank, and managed all the space shuttle main propulsion systems while at Marshall. He also served as director of the Institutional and Program Support Directorate, and headed efforts to develop a new heavy-lift launch vehicle. In two NASA assignments away from Huntsville, he served as acting direc-

tor of the Stennis Space Center, on the space station redesign team that handled initial integration of the Russian elements into the Space Station Program.

Littles, currently associate administrator for the Office of Space Flight, was named director Tuesday.

"Dr. Littles has the necessary managerial and technical experience to lead Marshall into the 21st century," Goldin said. "As the agency's center of excellence for space propulsion, I want Marshall to lead the world in research and development of next generation propulsion systems. Dr. Littles is uniquely qualified to provide the leadership necessary to meet that challenge."

As the head of the Office of Space Flight, Littles directed both the shuttle and station programs for NASA. During his tenure, NASA restructured the Space Station Program, streamlined the management of the program by putting it under a single prime contractor, and led discussions with the Russian Space Agency concerning their participation and contributions to the space station.

Pending selection of a replacement, Wilbur Trafton, who currently is director of the International Space Station Program, will be the acting associate administrator for the Office of Space Flight.

## Thagard returns to home state

(Continued from Page 1)

STS-7 in 1983 and STS 51-B in 1985, both aboard *Challenger*; STS-30 in 1989 on *Atlantis*; STS-42 in 1992 on *Discovery*; and on the Mir-18 mission on the space station last year. On that flight, Thagard was launched with two cosmonauts aboard a Soyuz rocket and landed aboard *Atlantis* at the conclusion of the first shuttle/Mir docking mission.

Becoming an astronaut was one of Thagard's dreams. Another was to return to his alma mater, from which he received bachelor and master of

science degrees in engineering science in 1965 and 1966, respectively. "The only thing other than being an astronaut was to come back to Florida State to teach," Thagard said. His doctor of medicine degree came in 1977 from the University of Texas Southwestern Medical School.

Thagard is a pilot and has logged more than 2,200 hours flying time, primarily in jet aircraft. With the completion of his fifth space mission, Thagard has spent over 140 days in space — more than any other American.

## Astronauts test connectors, cables in two separate space walks

(Continued from Page 1)

Mission Specialists Leroy Chiao and Winston Scott tested connectors, cables and work platforms for almost seven hours in *Endeavour's* cargo bay Tuesday night and Wednesday morning.

Chiao and Scott floated into the bay at 11:54 p.m. Tuesday as *Endeavour* passed over Africa. The space walk began about one hour late as the astronauts took longer than expected to don their suits. Chiao and Scott worked with utility boxes, slidewires and a portable work stanchion affixed to *Endeavour's* robot arm to gather additional data on methods and procedures which may be incorporated in the techniques which will be used to assemble the station.

Flight controllers had to juggle space walk activities due to the delayed start and a drop in temperatures in the thruster fuel lines on the Japanese Space Flyer Unit satellite. Duffy maneuvered *Endeavour* to a warmer attitude, allowing SFU temperatures to increase. The maneu-

ver slightly delayed one of the major tasks of the space walk—a test of how well Scott's space suit would offset the temperatures of space.

Late in the space walk, Scott climbed into foot restraints on the OAST-Flyer satellite platform for the thermal evaluation exercise. *Endeavour* was maneuvered to the coldest position possible, with its payload bay facing toward deep space and allowing temperatures to dip to about 104 degrees below zero at the point where Scott was positioned. The space walk concluded at 6:34 a.m. Wednesday, with the two astronauts logging 6 hours and 54 minutes in the vacuum of space.

Jett and Wakata worked alongside space walk coordinator Dan Barry on *Endeavour's* aft flight deck, operating the ship's robot arm to move Chiao and Scott about the cargo bay in support of their various tasks.

As Chiao and Scott began their space walk, flight controllers repressurized *Endeavour's* cabin to 14.7 pounds per square inch to help warm the shuttle and dislodge ice

from the ship's flash evaporator system. The system is used to dissipate heat from the shuttle and its avionics in association with radiators mounted on the inside of the payload bay doors. Shortly after the astronauts completed their space walk, *Endeavour's* flash evaporator system was successfully purged and resumed working at full capacity.

In the first space walk on Sunday night and Monday morning, Chiao and Barry spent six hours and nine minutes in *Endeavour's* cargo bay. With Scott acting as the space walk coordinator from the aft flight deck, Chiao and Barry floated out of the airlock at 11:35 p.m. Sunday.

Chiao and Barry attached a portable work platform to the end of the robot arm, operated by Jett and Wakata. Jett used the arm to grapple various pieces of hardware designed to hold large modular components, mimicking the way equipment boxes and avionics gear will be moved back and forth in assembling the International Space Station.

Chiao and Barry unfolded a cable

tray diagonally across the forward portion of the cargo bay housing electrical and fluid lines similar to those that will connect modules and nodes of the space station. The rigid umbilical was tested for its ease of handling and the ability of the astronauts to hook up lines to connectors.

While Chiao unraveled various lengths of cable, Barry spent time practicing the hookup of the cables in the rigid umbilical to connectors, testing his ability to manipulate tiny bolts and screws in weightlessness. He reported that most tasks could be accomplished with little difficulty. The astronauts concluded their space walk at 5:44 a.m. Monday.

The retrieval of two satellites went smoothly, even though the first satellite had two failed thrusters solar panels that would not latch properly.

Wakata extended *Endeavour's* robot arm Tuesday to pluck the 2,600-pound OAST-Flyer science satellite out of orbit. The satellite was grappled at 3:47 a.m., following two days of free-flying investigations. The capture of the OAST-Flyer cul-

minated a textbook rendezvous performed by Duffy and Jett, who guided *Endeavour* alongside through a series of maneuvering jet firings. The OAST-Flyer was deployed by Wakata at 5:32 a.m. Sunday.

The OAST-Flyer contained four experiments that studied spacecraft contamination, the use of the Global Positioning System for spacecraft attitude control, laser-initiated pyrotechnic devices in the environment of space, and an amateur radio experiment to allow radio operators on the ground to track the satellite.

On Saturday, Wakata had used *Endeavour's* robot arm to retrieve the Japanese Space Flyer Unit satellite. The SFU was captured at 4:57 a.m. completing its 10-month scientific voyage which began with its launch on a Japanese rocket.

The retrieval followed the jettison of both of the SFU's solar arrays when the satellite's solar panels did not latch properly against the satellite after being retracted. The contingency procedure delayed the capture by about an hour and half.